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BOLIVIAN PRODUCTIVITY AND COMPETITIVENESS PROJECT

**Annual Environmental Report
2011**

October, 2011

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BOLIVIAN PRODUCTIVITY AND COMPETITIVENESS PROJECT

Annual Environmental Report 2011

USAID/BOLIVIA
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Denise Fernández, COTR
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BOLIVIAN PRODUCTIVITY AND COMPETITIVENESS PROJECT

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Presentation

The 2011 Annual Environmental Report covers a year of BPC activities (October 2010 to September 2011); it is based on our experiences from this period and is defined in BPC's Annual Work Plan and in the Environmental Monitoring Manual; its purpose is to account for the degree of compliance with environmental recommendations made by BCP to manufacturing MSMEs in the following value chains: Textile and Apparel, Wood and Wood Furniture, Processed Foods, and Biocommerce.

To present this annual evaluation of environmental issues in MSMEs supported by BPC, the Report is divided into five sections.

In the first section, entitled **Precedents**, BPC's support of manufacturing MSMEs is placed in the context of the challenge of Bolivian industrial development, which must be framed in achieving economic growth with low Carbon production. Industry, as the motor of the Bolivian productive apparatus, must not only cooperate in generating employment, substituting importations, and overcoming poverty, but it must also seek to reduce polluting discharges from industrial units in order to diminish the greenhouse effect.

In the second section, named **Report Objectives**, the scope of this Environmental Report is detailed, arising from the objective of evaluating compliance with environmental recommendations made in the framework of Technical Assistance activities and Public-Private Partnerships carried out by BPC during fiscal year 2011.

The third section is named **Approach and Methodology**. It presents the idea behind the instruments used to elaborate the Report, which is based on respect for the environment and a sequential application of the environmental assessment datasheets and charts for assessing mitigation indicators.

The fourth section is named **Evaluation Results**, which presents progress made during the fiscal year in three sub-sections: General Results, Results by Value Chain, and Results by Pollution Levels.

The fifth and last section, named **Lessons Learned**, presents a series of recommendations to improve the efficiency of BPC interventions from the perspective of Cleaner Production and Energy Efficiency.

In addition to these chapters, the report is complemented with two appendixes: (i) LIST OF USAID ENVIRONMENTAL DATASHEETS, which registers all of the Datasheets and Recommendations made in each of the value chains and which support the findings of this Report; and (ii) INSPECTION VISIT CHART, which provides a registry of all of the inspection visits carried out by BPC specialists in order to verify compliance with Environmental Suggestions made to supported MSMEs.

Precedents

From October 2010 to September 2011, BPC elaborated Environmental Datasheets and Mitigation Plans in compliance with USAID's Regulation 216 and the Cleaner Production and Energy Efficiency policies adopted in the framework of its interventions in technical assistance and establishment of PPPs.

The introduction of CP & EE in MSMEs and Producer Associations supported by BPC has been carried out along three complementary axes:

- Saving water, raw materials, and other consumables.
- Saving thermal and electric energy and fuels.
- Recycling and reutilizing industrial materials.

In other words, BPC's Cleaner Production strategy consists of reducing current levels of specific discharges in MSMEs while at the same time seeking to increase levels of productivity and sales, in addition to reducing pollution risks and reducing specific polluting discharges, applying this approach produced savings in production costs for manufacturing MSMEs.

BPC's follow-up methodology carried out through Environmental Datasheets and Technical Visits allowed positive impacts caused by BPC activities to be measured in terms of saved resources and diminished polluting discharges.

Although economic studies show a positive correlation between the size of a firm and its environmental awareness (i.e., the greater the size of the firm, the greater the awareness), BPC's efforts to introduce Cleaner Production and Energy Efficiency in manufacturing MSMEs show that it is possible to frame their production activities within the physical restrictions imposed by respecting the environment and adapting to global warming.

Report Objectives

BPC's role in terms of environmental responsibility consists of mitigating potential negative impacts arising from its technical interventions. With that in mind, this Report has the following objectives:

General Objective

Evaluate the compliance of BPC's environmental recommendations contained in the Mitigation Plans in supported MSME's.

Specific Objectives

- Compare environmental risks and mitigation plans by value chains.
- Make key recommendations for internal measures to improve environmental monitoring and evaluation processes in BPC interventions.

The fulfillment of these objectives will consolidate a representative set of MSMEs implementing Cleaner Production in the Bolivian production apparatus which will serve as a model for other firms, encouraging them to adopt environmentally-friendly practices and to face the challenge of reducing polluting impacts arising from industrial activities.

Approach and Methodology

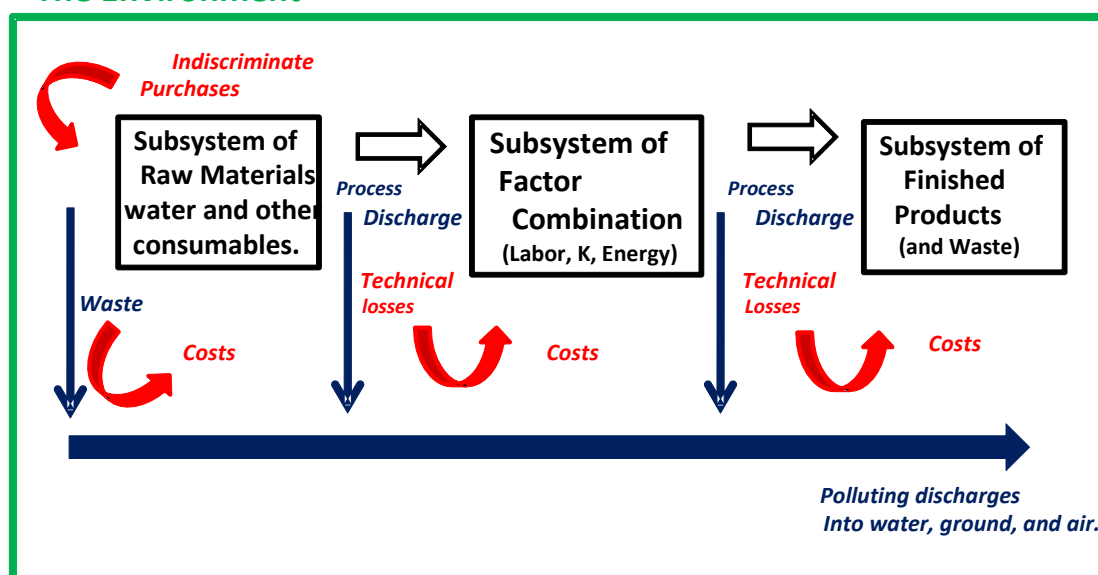
Approach

Although the carbon footprint of the industrial sector in Bolivia is low in relation to that of other countries, it's foreseeable that the impacts caused by greater levels of industrialization (arising from a strategy for national development and growth) will tend to increase polluting discharges in general and in specific greenhouse effect gases (especially carbon dioxide –CO₂, methane –CH₄ and nitrous oxide – N₂O).

Since and MSME is, in physical terms, a system which transforms raw materials into finished products using some or various kinds of energy, the challenge faced by BPC is preventing polluting risks and reducing polluting discharges in all stages of the industrial process, which, as presented in the graph below, cause material losses and additional costs to the productive units.

INDUSTRY AS A TRANSFORMATION SYSTEM (Diagnosed MSME)

The Environment

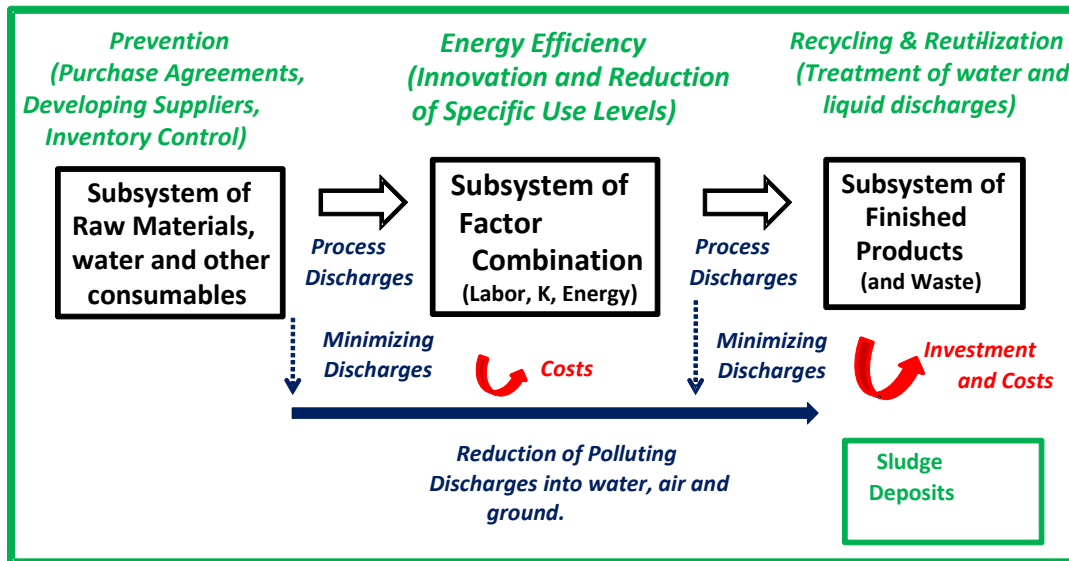


The polluting discharges represented in blue in the previous graph, as well as the costs incurred by MSMEs, represented in red, are minimized through adequate CP & EE interventions.

The following graph highlights the type of environmental recommendations implemented by BPC in the supported manufacturing MSMEs (in green), which are structured for each of the stages of the industrial process: (1) prevention activities previous to the purchase of raw materials and other consumables, (2) reducing specific consumption levels in industrial transformation processes, and (3) recycling of industrial materials, treatment of liquid discharges, and confinement of industrial sludge to diminish environmental pollution.

**INDUSTRY AS A TRANSFORMATION SYSTEM
(Supported MSME)**

The Environment



Methodology

The key aspect of BPC's methodology consists of carrying out measurements in supported MSMEs at three different moments: the first measurement is carried out at the beginning of the technical assistance with the purpose of establishing a starting-point data base; the second measurement is carried out during the process of the technical assistance activity with the purpose of verifying the feasibility and the benefits of the environmental recommendations; the third measurement is carried out at the end of the technical assistance, with the purpose of verifying compliance with environmental recommendations set forth in the USAID environmental assessment datasheets (both in qualitative and percentage terms).

The stages followed in this report (which include the previously mentioned measurement points) are the following:

- First Stage: Elaboration of USAID Environmental Assessment Datasheets

From September 2010 to October 2011, eighty-four Environmental Assessment Datasheets were filled out, corresponding to forty technical assistance activities (47%), nineteen PPPs (23%), nineteen Tradeshow (23%) and six Institutional Strengthening Grants (7%).

Out of the forty Technical Assistance Environmental Assessment Datasheets, nineteen were carried out in the Textile and Apparel value chain (48%), eight in the Processed Foods value chain (20%), seven in the Biocommerce value chain (17%), four in the Wood and Furniture value chain (10%), one in the Handcrafts value chain (2,5%) and one in a Multi-Sector activity (2,5%), i.e. in benefit of firms from all five of the value chains supported by BPC).

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| USAID Environmental Assessment Datasheets | | | | | |
|---|-----------------------|-----------------------------|------------|---------------|-----------|
| Value Chain | Technical Assistances | Public-Private Partnerships | Tradeshows | Strengthening | Total |
| Textile and Apparel | 19 | 1 | 1 | 3 | 24 |
| Wood and Furniture | 4 | 1 | 15 | | 20 |
| Processed Foods | 8 | 12 | | | 20 |
| Biocommerce | 7 | 4 | | | 11 |
| Handcrafts | 1 | | 2 | | 3 |
| Multi-sector | 1 | 1 | 1 | 3 | 6 |
| TOTALS | 40 | 19 | 19 | 6 | 84 |

BPC elaborated the Environmental Assessment Datasheets during visits made to verify information provided by technical assistant proponents. Each USAID Environmental Assessment Datasheet has two parts: the first one identifies potential environmental risks caused by the technical assistance activities, and the second lists environmental recommendations suggested by BPC technicians.

- Second Stage: Elaborate Cleaner Production Forms

In addition, the institutions subcontracted to carry out the technical assistance activities elaborated one hundred and ninety-four Cleaner Production forms, one for each of the group of MSMEs which received technical assistance co-financed by BPC.

Cleaner Production Forms involve elaborating data bases for each of the supported firms, with specific parameters for usage levels for raw materials, consumables, water, electricity, fuel, and other energy sources. This data base serves the purpose of establishing a starting-point from which to begin the optimization process aimed at reducing specific use levels.

| CP – IS & OH Forms | |
|-------------------------|------------|
| Chain | MSMEs |
| Textile and Apparel | 64 |
| Wood and Wood Furniture | 40 |
| Processed Foods | 35 |
| Biocommerce | 19 |
| Handcrafts | 10 |
| Multi-sector | 26 |
| TOTAL | 194 |

Cleaner Production Forms complement the environmental assessment and the mitigation recommendations included in USAID datasheets and allow for a more detailed follow-up of each of the supported firms.

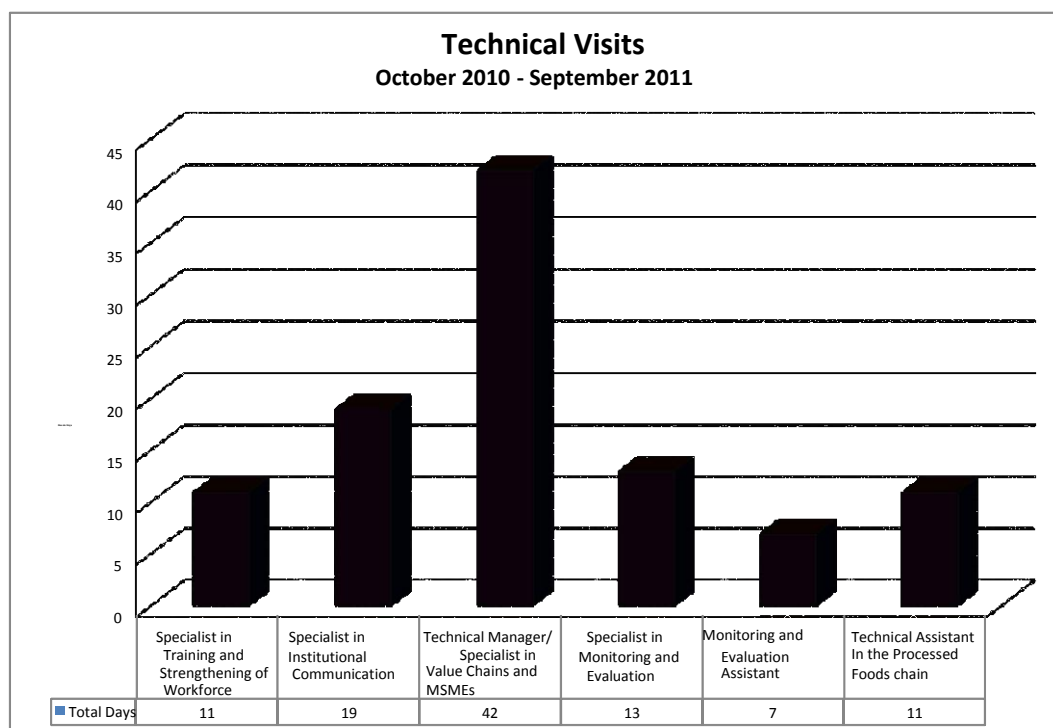
- Third Stage: Technical Visits

Technical Visits with the purpose of verifying specific parameters of consumption levels and application of environmental recommendations in the industries supported by BPC were carried out by our technical staff according to the following responsibilities:

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- Cecilia Segovia: Specialist in the Textile and Apparel value chain
- Ximena Jáuregui: Specialist in the Handcrafts and Biocommerce value chains
- Pamela Carrasco: Specialist in the Processed Foods value chain
- Luis Pardo: Specialist in the Wood and Wood Furniture value chain
- Adhemar Aparicio: Monitoring Specialist
- José Montaña: Responsible for Monitoring

Technical visits were conducted in the company of BPC's subcontracted institutions and consisted of verifying the degree of compliance with environmental recommendations in each of the firms. The environmental recommendations were classified by a timetable criterion (short, mid, and long term), and compliance with the recommendations was measured on a percentage basis.



• Fourth Stage: Analysis of Findings

The last stage in the elaboration of this environmental report consisted of analyzing findings from the technical visits and classifying them into different groups according to different criteria.

- General Evaluation, which accounts for the number of MSMEs, out of the total number, which are carrying out the short, mid, and long-term recommendations.
- Evaluation by Value Chain, which compares the degree of compliance with the environmental impact mitigation recommendations in each of the supported value chains.
- Evaluation by Risk Level, which compares compliance with environmental recommendations, grouping MSMEs according to their risk level (from higher to lower).

Evaluation Results

In this context, and following the described methodology, the results from BPC's environmental monitoring are listed below.

General Results

Out of the supported firms, 90% have implemented the short-term recommendations. Short-term recommendations (one year of implementation), are basically **Good Management Practices** which involve identifying practices that do not require high investment due to their simplicity; these recommendations are generally aimed at improving and optimizing work in transformation processes and complying with basic environmental regulations. After the technical visits, the 10% of MSMEs that have not implemented the short-term environmental regulations have committed to do so.

Regarding mid-term environmental recommendations, the progress is 15% since their implementation requires greater commitment and expense by the MSMEs. Mid-term recommendations (two to three years) refer to **Changes in the Production Process**, involving investments to modify an industry's mass balance with the purpose of achieving optimization and minimizing residues and atmospheric emissions.

Progress in long-term recommendations is 5%, since they require high investment by the MSMEs. Long-term recommendations (five to ten years) involve **Technological Changes** consisting of substituting machinery for state-of-the-art technology (which involves changes in production functions, combination of production factors, and an MSME's mass balance). These measures are applied after pursuing all other options in Good Manufacturing Processes and Production Process Changes.

Results by Value Chain

- Textile and Apparel Value Chain

For the purposes of this environmental assessment, the Textile and Apparel chain has been divided into two subsectors: the washing subsector and the garment-making sector. This division, as detailed in the next section, is due to the high level of pollution caused by washing subsector, in contrast with the almost non-existent level of pollution in the garment-making sector.

- Washing

The washing subsector involves high use of water and detergent, as both are required to wash and fade jeans. In addition to these technical characteristics, MSMEs use water which is pumped from wells and then dumped into the public sewage system.

- Laundries in Santa Cruz

This sector has high potential for export. The ability to create new fashions and the skill in fading the jean fabric has positioned garments from Santa Cruz in local markets and in the Argentine market (through unregistered exportations). The water used for the washing and fading was dumped into the public drains, and none of the firms were environmentally aware of this until the technical visits were carried out. The Environmental Assessment Datasheets included the following recommendations:

- a) Encourage the introduction of water-saving practices and the optimal use of this resource.
- b) Encourage the construction of recycling and treatment pools for discharges produced by the washing machines.
- c) Comply with national environmental regulations, especially those involving the Environmental License and Discharge Quality.
- d) Plan the relocation of plants to Industrial Parks.

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The environmental assessment chart elaborated for this report shows that 90% of the short-term measures suggested by BPC and our subcontracted partners have been fulfilled.

| BPC ENVIRONMENTAL ASSESSMENT CHART Textile and Apparel Chain. Sector: Jean Washing | | | | | | | | |
|---|---|------------|---|--------------|---|--|----------------------|-------------------------------------|
| #. | TA Description | Location | Firms | Sucontractor | Environmental Recommendations | Recommendation Timeframe | Technical Visit Date | Progress |
| 1 | Technical Assistance to firms from the Gamma Group. TA in washing processes started in December 2010 and ended in September 2011. | Santa Cruz | a) Fornax Jean b) Bisonte Jean | APÓSTROFE | a) Introduce water-saving practices; optimize use of this resource. b) Build recycling and treatment pools for liquid discharges from washing machines. c) Relocate plant to an Industrial Park. d) Train staff in the adequate use of chemical substances and in the importance of using Safety and Protection Equipment. | a) Short-term b) Mid-term c) Long-term d) Long-term | 12/05/2011 | a) 90% b) 10% c) 0% d) 70% |
| 2 | Technical Assistance to firms from the Alfa Group. TA in washing and production processes started in December 2010 and ended in September 2011. | Santa Cruz | a) Stop Jean b) Leito Jean c) Ronin Jeans | APÓSTROFE | a) Introduce water-saving practices; optimize use of this resource. b) Build recycling and treatment pools for liquid discharges from washing machines. c) Relocate plant to an Industrial Park. d) Train staff in the adequate use of chemical substances and in the importance of using Safety and Protection Equipment. | a) Short-term b) Mid-term c) Long-term d) Long-term | 12/05/2011 | a) 90% b) 10% c) 0% d) 70% |
| 3 | Technical Assistance to firms from the Beta Group. TA in washing and production processes started in December 2010 and ended in September 2011. | Santa Cruz | a) Gas Oil b) Gasoline c) Wamach | APÓSTROFE | a) Introduce water-saving practices; optimize use of this resource. b) Build recycling and treatment pools for liquid discharges from washing machines. c) Relocate plant to an Industrial Park. d) Train staff in the adequate use of chemical substances and in the importance of using Safety and Protection Equipment. | a) Short-term b) Mid-term c) Long-term d) Long-term | 12/05/2011 | a) 90% b) 10% c) 0% d) 70% |

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- Laundries in Cochabamba

Like this subsector in Santa Cruz, laundries in Cochabamba have high potential for growth. Chile is the main export market, with Argentina as the second most important destination. Unregistered exportations are made to both markets. BPC's environmental recommendations to laundries in Cochabamba were the same as those made to laundries in Santa Cruz. In the case of the Cochabamba laundries, they are currently being pressured by the municipal government to solve their pollution issues, because the Lake Alalalay neighbors have complained about the current levels of putrefaction in the surface waters, which place the health of the population at risk.

The environmental assessment chart elaborated for this report shows that 90% of the short-term measures suggested by BPC and our subcontracted partners have been fulfilled.

| | | | | | | | | |
|---|---|------------|---|-------------------------|--|---|------------|---|
| 4 | Technical assistance to three firms operating in Cochabamba. TA in garment production began in July 2011 and ends in July 2012, with corresponding monitoring and follow-up. | Cochabamba | a) Brener b) Fremar c) Williams | ADES | a) Introduce water-saving practices; optimize use of this resource. b) Build recycling and treatment pools for liquid discharges from washing machines. c) Relocate plant to an Industrial Park. d) Train staff in the adequate use of chemical substances and in the importance of using Safety and Protection Equipment. e) Maintain order and cleanliness in the work area. f) Keep records of sales of leftover material from cutting and garment-making. | a) Short-term b) Long-term c) Long-term d) Mid-term e) Short-term f) Long-term | 12/09/2011 | a) 90% b) 10% c) 0% d) 70% e) 80% f) 50% |
| 5 | Technical assistance to four firms operating in Cochabamba. TA in garment production begins in December 2011 and ends in October 2012, with corresponding monitoring and follow-up. | Cochabamba | a) Batos b) Emcom c) Jema d) Mio | Servicios Empresariales | a) Introduce water-saving practices; optimize use of this resource. b) Build recycling and treatment pools for liquid discharges from washing machines. c) Train staff in the adequate use of chemical substances and in the importance of using Safety and Protection Equipment. d) Maintain order and cleanliness in the work area. e) Keep records of sales of leftover material from cutting and garment-making. | a) Short-term b) Long-term c) Mid-term d) Long-term e) Long-term | 12/09/2011 | a) 90% b) 10% c) 70% d) 80% e) 50% |
| 6 | Technical assistance to three firms operating in Cochabamba. TA in garment production begins in December 2011 and ends in October 2012, with corresponding monitoring and follow-up. | Cochabamba | a) Cotexco b) Cesar Cruz c) Silvio Choque | Servicios Empresariales | a) Introduce water-saving practices; optimize use of this resource. b) Verify measurements of discharge recycling and treatment pools, in addition to periodic maintenance of the pools. (Cotexco). c) Train staff in the adequate use of chemical substances and in the importance of using Safety and Protection Equipment. d) Maintain order and cleanliness in the work area. e) Keep records of sales of leftover material from cutting and garment-making. | a) Short-term b) Long-term c) Short-term d) Short-term e) Long-term | 12/09/2011 | a) 90% b) 10% c) 50% d) 80% e) 50% |

- Textile and Apparel Value Chain

Garment-producing MSMEs don't present significant pollution risks since they involve dry processes (cutting and sewing, mostly). The main recommendations arising from the technical visits are the following:

- Train staff in the adequate use of chemical substances, as well as on the importance of Personal Protection Equipment (especially facemasks).
- Maintain order and cleanliness in the work area.
- Keep records of sales of leftover fabric from cutting and garment-making.
- Ensure that areas of the MSME working in the finishing of the products are well-ventilated.

The environmental assessment chart elaborated for this report shows that 90% of the short-term measures suggested by BPC and our subcontracted partners have been fulfilled.

| BPC ENVIRONMENTAL ASSESSMENT DATASHEET CHART Textile and Apparel Value Chain. Sector: Garment Production | | | | | | | | |
|---|--|------------|---|-------------------------|--|--|----------------------|----------------------------|
| # | Technical Assistance Description | Location | Firms | Subcontractor | Environmental Recommendations | Recommendation Timetable | Technical Visit Date | Progress |
| 1 | Technical assistance to three firms operating in Cochabamba. TA in garment production began in July 2011 and ends in July 2012, with corresponding monitoring and follow-up. | Cochabamba | a) Jialum b) Pachis Sport c) Progreso | ADES | a) Train staff on the importance of using protection equipment, in this case facemasks. b) Maintain order and cleanliness in the work area. c) Keep records of sales of leftover material from cutting and garment-making. | a) Mid-term b) Short-term c) Long-term | 12/09/2011 | a) 70% b) 90% c) 10% |
| 2 | Technical assistance to three firms operating in Cochabamba. TA in garment production begins in December 2011 and ends in October 2012, with corresponding monitoring and follow-up. | Cochabamba | a) Opri b) Modas Sabrina c) Infinit | Servicios Empresariales | a) Train staff on the importance of using protection equipment, in this case facemasks. b) Maintain order and cleanliness in the work area. c) Keep records of sales of leftover material from cutting and garment-making. | a) Mid-term b) Short-term c) Long-term | 12/09/2011 | a) 70% b) 90% c) 10% |

- Wood and Furniture Value Chain

The risk of mismanaging forest resources doesn't necessarily lie in the industrial link, but in the primary sector, the forest, which is where the wood is extracted from, many times illegally.

Risks associated with the manufacturing industry (production of wooden parts and furniture), especially in reference to carpentry MSMEs, are closely linked to industrial safety and respect for regulations on wood supply. The main recommendations arising from the technical visits contained in the Environmental Assessment Datasheets are the following:

- Train staff on the importance of the use of Personal Protection Equipment such as facemasks, gloves, and boots.
- Maintain order and cleanliness in the work area.
- Keep records of leftover wood sales.
- Purchase wood from legally certified suppliers.
- Train staff on the adequate handling of different finishing products: solvents, varnishes, and dyes.

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- Correctly store and label chemical substances such as varnishes, dyes, and solvents.
- Store wood correctly to optimize its use and minimize avoidable losses and damages.

The environmental assessment chart elaborated for this report shows that 90% of the short-term measures suggested by BPC and our subcontracted partners have been fulfilled.

BPC ENVIRONMENTAL ASSESSMENT DATASHEETS

Wood and Wood Furniture Value Chain. Sector: Design and Finishing

| # | Technical Assistance Description | Location | Firms | Subcontractor | Environmental Recommendations | Recommendation Timeframe | Technical Visit Date | Progress |
|---|---|--|---|---------------|---|---|----------------------|---|
| 1 | Technical assistance aimed at improving wood storage and classification systems, organization, and order and cleanliness in the firms by providing tools machinery and equipment maintenance. | Santa Cruz | a) Dicomac b) Osinaga c) Maladi Tex d) Galarza Carpentry e) San Joaquin Carpentry | CADEFOR | a) Train staff on the importance of the use of Personal Protection Equipment such as facemasks, gloves, and boots. b) Maintain order and cleanliness in the work area. c) Keep records of leftover wood sales. d) Purchase wood legally obtained from certified suppliers. e) Train staff on the adequate handling of different finishing products: solvents, varnishes, and dyes. f) Correctly store and label chemical substances such as varnishes, dyes, and solvents. g) Store wood correctly to optimize its use and minimize avoidable losses and damages. | a) Mid-term b) Short-term c) Long-term d) Long-term e) Mid-term f) Short-term g) Short-term | 12/07/2011 | a) 70% b) 80% c) 10% d) 5% e) 50% f) 60% g) 40% |
| 2 | Technical assistance to eight firms operating in Cochabamba. TA in furniture production started in May 2011 and ends in March 2012, with corresponding monitoring and evaluation. | a) Amara b) Arcadia c) Jhenida d) T y D e) Benergy f) Brocante g) Maderva h) Russly | APIMEC | | a) Train staff on the importance of the use of Personal Protection Equipment such as facemasks, gloves, and boots. b) Maintain order and cleanliness in the work area. c) Keep records of leftover wood sales. d) Purchase wood legally obtained from certified suppliers. e) Train staff on the adequate handling of different finishing products: solvents, varnishes, and dyes. f) Correctly store and label chemical substances such as varnishes, dyes, and solvents. g) Store wood correctly to optimize its use and minimize avoidable losses and damages. | a) Mid-term b) Short-term c) Long-term d) Long-term e) Mid-term f) Short-term g) Short-term | 12/09/2011 | a) 70% b) 80% c) 10% d) 5% e) 50% f) 60% g) 40% |

- Processed Foods Chain

As in the case of fabric washing, industrial processes in the food subsector require large amounts of water. This characteristic, in addition to the need to maintain good manufacturing processes to guarantee hygiene and quality, makes the food sector an environmentally high-risk chain. The main recommendations arising from the technical visits contained in the Environmental Assessment Datasheets are the following:

- Train staff on the importance of correct, i.e. safe, handling of food.
- Maintain order and cleanliness in the work area.
- Incorporate warning signs in different work areas.
- Reorganize production process seeking to optimize resources, production times, and production movements, while minimizing pollution.

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The environmental assessment chart elaborated for this report shows that 90% of the short-term measures suggested by BPC and our subcontracted partners have been fulfilled.

BPC ENVIRONMENTAL ASSESSMENT DATASHEETS

Processed Foods Value Chain. Sectors: Dairy products, meat products, fruits, and cereals

| # | Technical Assistance Description | Location | Firms | Subcontractor | Environmental Recommendations | Recommendation Timeframe | Technical Visit Date | Progress |
|---|---|------------|---|---------------|--|---|----------------------|--|
| 1 | Technical assistance to three firms from the fruit sector in the city of Santa Cruz. TA focused on improving quality and creating new products required by the market. TA started in August 2011 and ends in January 2012, with corresponding monitoring and evaluation | Santa Cruz | a)Alimenta b) Tecnoalimentos c) Zumos | APOSTROFE | a) Train staff on the importance of correct, i.e. safe, handling of food. b) Maintain order and cleanliness in the work area. c) Incorporate warning signs in different work areas. | a) Mid-term b) Short-term c) Mid-term | 12/06/2011 | a) 80% b) 80% c) 60% |
| 2 | Technical assistance to three bakery firms in the city of Santa Cruz. TA focused on improving quality and creating new products required by the market. TA started in August 2011 and ends in January 2012, with corresponding monitoring and evaluation | Santa Cruz | a)Belen b) Asael c) Abasteciendo | APOSTROFE | a) Train staff on the importance of correct, i.e. safe, handling of food. b) Maintain order and cleanliness in the work area. c) Incorporate warning signs in different work areas. d) Organize process | a) Mid-term b) Short-term c) Mid-term d) Mid-term | 12/06/2011 | a) 80% b) 80% c) 60% d) 50% |
| 3 | Technical assistance to candy firms in the city of Santa Cruz. TA focused on improving quality and creating new products required by the market. TA started in August 2011 and ends in January 2012, with corresponding monitoring and evaluation | Santa Cruz | a)Manjar de Oro b) Itenez c) Casab | APOSTROFE | a) Train staff on the importance of correct, i.e. safe, handling of food. b) Maintain order and cleanliness in the work area. c) Incorporate warning signs in different work areas. | a) Mid-term b) Short-term c) Mid-term | 12/06/2011 | a) 80% b) 80% c) 60% |
| 4 | Technical assistance to twelve firms in different areas of the food sector in the city of Las Paz. TA focused on improving quality and creating new products required by the market, Good Manufacturing Practices, labeling, and other issues. TA started in December 2011 and ends in January 2012, with corresponding monitoring and evaluation | La Paz | a) Industrias Criollo b) Alimentos Saludables c) Suma Jakasiña d) Ecologizate e) Organic Mountain Café f) Desiertos Blancos g) Delicias Capani h) Flor de Leche i) La Campiña j) Mamina k) Suma Milki | CNI | a) Train staff on the importance of correct, i.e. safe, handling of food. b) Maintain order and cleanliness in the work area. c) Incorporate warning signs in different work areas. d) Organize process | a) Mid-term b) Short-term c) Mid-term d) Mid-term | 12/12/2011 | a) 80% b) 80% c) 60% d) 50% |
| 5 | Technical assistance to four firms in different areas of the food sector in the city of Las Paz. TA focused on improving quality and creating new products required by the market, Good Manufacturing Practices, labeling, and other issues. TA started in December 2011 and ends in January 2012, with corresponding monitoring and evaluation | La Paz | a)Sami b) Furema c) Agrocafe | CREAR | a) Train staff on the importance of correct, i.e. safe, handling of food. b) Maintain order and cleanliness in the work area. c) Incorporate warning signs in different work areas. d) Organize process. e) In Furema's case, install water-treatment tanks f) In Sami's case, improve the arrangement of the raw materials | a) Mid-term b) Short-term c) Mid-term d) Mid-term e) Long-term f) Mid-term | 12/13/2011 | a) 80% b) 80% c) 60% d) 50% e) 10% f) 30% |

- Biocommerce Value Chain

In the Biocommerce chain, environmental risks are minimal because, unlike the other three value chains, work in this sector is done from an integral approach, from the planning of sustainable forest management to the industrialization of health-benefitting products (foods and cosmeceuticals).

The main recommendations arising from the technical visits contained in the Environmental Assessment Datasheets are the following:

- Train staff on the importance of using work clothes.
- Maintain order and cleanliness in the work area.
- Purchase legal raw materials from suppliers with sustainable management plans.
- Keep a registry of raw material purchases and origins.
- Install warning signs in the plant.

The follow-up chart reveals that the firms in this value chain have the highest levels of compliance with environmental suggestions. Short-term measures are close to 80% compliance and mid-term measures are close to 50%. This should not come as a surprise, since the level of environmental responsibility of the stakeholders participating in this value chain is higher precisely because the theoretical basis for their economic activity rests on sustainable management of non-timber forest products.

BPC ENVIRONMENTAL ASSESSMENT DATASHEETS

Biocommerce Value Chain. Sector: Products made from natural oils

| Technical Assistance Description | Location | Firms | Environmental Recommendations | Recommendation Timeframe | Progress |
|--|------------|------------------|---|--|--------------------------------------|
| Oleuns Beauty is a private firm from Santa Cruz which works in the Biocommerce chain, adding value and transforming raw materials from the Amazon forest. | Santa Cruz | a) Oleuns Beauty | a) Train staff on the importance of using work clothes. b) Maintain order and cleanliness in the work area. c) Keep order and control of raw materials d) Incorporate warning signs in different work areas. | a) Mid-term b) Short-term c) Mid-term d) Mid-term | a) 50% b) 80% c) 70% d) 50% |
| The first started operating in 2006 with soap as its initial product; they then developed a line of products with exceptional cosmetic properties, and at an affordable price. The products are made from palm oil, chestnut oil, and copuaçu butter, produced by dozens of gatherer families in the Guarayos zone, and from families in the Beni and Pando zones. | Cochabamba | a) Cosnatval | a) Train staff on the importance of using Personal Protection Equipment, in this case facemasks and gloves. b) Maintain a sequential order in the work area c) Place warning signs in the plant. | a) Mid-term b) Mid-term c) Long-term | a) 70% b) 80% c) 40% |

Results by Environmental Risk Level

If we classify the value chains BPC works with in terms of their polluting potential and name them specifically by the type of MSME which make up the group of firms receiving technical assistance, this is the order, from highest to lowest, in terms of risk of environmental pollution.

- **Jean Washing**

This activity presents a two-fold risk: on the one hand, excessive use of potable water for each garment washed, and on the other hand, discharging toxic residues into the public draining system. However, local authorities, especially in Cochabamba, are pressuring MSMEs operating in this sector to comply with environmental regulations by optimizing their processes and relocating their plants to the Santibáñez Industrial Park. As a consequence, local or departmental authorities must consider expanding the industrial park. BPC held work meetings with the Cochabamba Washer Association with the purpose of linking the group to cleaner technology suppliers and orienting them towards reducing environmental pollution.

- **Carpentries and Furniture Plants**

The risk presented by these MSMEs is associated with lack of industrial safety in the wood-processing plants. Most of the MSMEs don't comply with the bare minimum employee safety regulations. BPC has supported MSMEs from La Paz and Cochabamba to incorporate safety routines and place warning signs. MSMEs from Santa Cruz have incorporated sensible regulations regarding the number of people that can move around the plant and regarding raw material recuperation within the plant.

- **Food Industries**

The highest risk in food-processing MSMEs is associated with unsanitary handling of foods (meats, cereals, fruits), excessive use of water (dairy and vegetables), and solid waste. BPC's technical assistance activities have been aimed at introducing Good Manufacturing Practices and reutilizing raw materials. These activities have resulted in greater safety in the processing of foods and in greater efficiency in the use of raw materials and consumables.

- **Garment-Producing Workshops.**

This sector presents minimal risk, associated with the use of paints and dyes used for the stamping and finishing of clothing garments and with the fine dust produced when cutting and producing the garments. BPC's recommendations of ventilating work spaces and using facemasks have minimized these risks.

- **Biocommerce Industries**

Technical visits verified that all of the supported MSMEs operating in this value chain acquire their raw materials from certified suppliers. BPC has kept and encouraged this requirement so as to minimize negative environmental impacts.

Lessons Learned

The following Lessons Learned involve improving the technical treatment of environmental problems and growing in efficiency in terms of supervising and controlling the prevention or mitigation measures recommended in the USAID Environmental Assessment Datasheets.

- **In the Apparel and Textile Chain**

For the purposes of future interventions, research or recommendations, it's important to separate the Jean Washing sector from the Garment Production sector due to the former's pollution levels and economic importance.

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Optimizing water consumption and reducing residual waters are key elements to achieving positive economic and environmental impacts in BPC's interventions. To do so, Technical Assistance activities must emphasize the analysis of the stages in the process which require greater amounts of water.

- In the Wood and Wood Furniture chain

Keep BPC's incentive policy which rewards MSMEs that obtain their raw materials from legal suppliers.

Establish a preventive maintenance program in installations and equipment to avoid electrical problems or any anomaly which could produce waste of energy or accident risks.

Separate residues by kind at the generation source: wood shavings, sawdust, or wood pieces.

Train MSME owners or managers in this chain on the need to provide machine operators with protection equipment needed to work in exposed areas for decibel levels higher than 85 dB (in the saw and planer work areas).

- In the Processed Foods chain

Foreseeing expansion in this sector, thought must be given to spreading integrated management systems which fuse Good Manufacturing Practices with Cleaner Production in the processing of foods.

Optimal use of water must be a specific intervention line for technical assistance activities in this chain.

Cold-storage chambers, freezers and refrigerators must be installed away from heat sources to avoid inadequate energy demands in the cooling process.

Cold-storage chambers, freezers and refrigerators must be inspected periodically to ensure they operate at the correct temperature level and show no signs of freezing.

Consumables must be set up close to the entrance of the cold-storage chamber and opening doors must be avoided to minimize air filtration and its consequent cold-air loss (thus reducing energy use).

- In the Biocommerce chain

National policy should try to increase the number of support operations aimed at Biocommerce MSMEs, as expanding these services will ensure the sustainable use of the Bolivian biodiversity.

Along the same lines, support policies for Biocommerce MSMEs must seek to benefit, primarily, the producers in the first link of the chain, as deforestation and expectations for agriculture and ranching are the main threat to this sustainable model.

BPC's support initiatives must continue to promote the optimal use of raw materials, especially chestnut oil, for the production of soaps, oils, lotions, and shampoos produced from fruits of the forest.

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APPENDIX 1

**LIST OF ENVIRONMENTAL DATASHEETS
BY VALUE CHAIN
(October 2010 to September 2011)**

| USAID ENVIRONMENTAL DATASHEETS OCTOBER 2010 - SEPTEMBER 2011 Handcrafts Value Chain | | | | |
|--|------|----------------------|--------------------------------|------------|
| # | Code | Activity | Institution | Start Date |
| 1 | 001 | Technical Assistance | OEPAIC Network | 1/14/2011 |
| 2 | 002 | Technical Assistance | OEPAIC Network | 2/01/2011 |
| 3 | 003 | Grant | National Chamber of Industries | 9/15/2011 |

| USAID ENVIRONMENTAL DATASHEETS OCTOBER 2010 - SEPTEMBER 2011 Biocommerce Value Chain | | | | |
|---|------|----------------------|------------------------------------|------------|
| # | Code | Activity | Institution | Start Date |
| 1 | 001 | Technical Assistance | FAN (Friends of Nature Foundation) | 1/17/2011 |
| 2 | 002 | Grant | COSNATVAL | 3/14/2011 |
| 3 | 003 | Grant | TACUABOL | 3/14/2011 |
| 4 | 006 | Grant | <i>Inmunovida</i> | 4/18/2011 |

| USAID ENVIRONMENTAL DATASHEETS OCTOBER 2010 - SEPTEMBER 2011 Processed Foods Value Chain | | | | |
|---|------|----------------------|--------------------|------------|
| # | Code | Activity | Institution | Start Date |
| 1 | 004 | Technical Assistance | APIMEC | 1/23/2011 |
| 2 | 005 | Grant | UNEC | 3/14/2011 |
| 3 | 006 | Grant | APROMAJI Muyupampa | 3/14/2011 |
| 4 | 007 | Grant | AFIPAC | 3/14/2011 |
| 5 | 008 | Grant | ACOPROCA-SUMITA | 3/14/2011 |
| 6 | 009 | Grant | APAFAM - El Villar | 3/14/2011 |
| 7 | 010 | Grant | APAJIMPA-I | 3/14/2011 |
| 8 | 011 | Grant | APROMAJI Pedernal | 3/14/2011 |
| 9 | 012 | Grant | ASOPROMANI Yacuiba | 4/04/2011 |
| 10 | 013 | Grant | CIAPEC | 4/04/2011 |
| 11 | 014 | Grant | PELLETS-Bolivia | 3/14/2011 |
| 12 | 015 | Grant | <i>La Francesa</i> | 3/14/2011 |
| 13 | 016 | Grant | NAKHAKI | 4/04/2011 |
| 14 | 017 | Grant | OLEUNS BEAUTY | 3/14/2011 |
| 15 | 018 | Technical Assistance | APOSTROFE | 8/26/2011 |
| 16 | 019 | Technical Assistance | APOSTROFE | 8/26/2011 |
| 17 | 020 | Technical Assistance | APOSTROFE | 8/26/2011 |

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| USAID ENVIRONMENTAL DATASHEETS OCTOBER 2010 - SEPTEMBER 2011 | | | | |
|--|------|----------------------|--------------------------------------|------------|
| Wood and Furniture Value Chain | | | | |
| # | Code | Activity | Institution | Start Date |
| 1 | 001 | Technical Assistance | National Chamber of Industries (CNI) | 1/17/2011 |
| 2 | 002 | Technical Assistance | National Chamber of Industries (CNI) | 2/01/2011 |
| 3 | 003 | Technical Assistance | National Chamber of Industries (CNI) | 3/01/2011 |
| 4 | 004 | Technical Assistance | National Chamber of Industries (CNI) | 3/01/2011 |
| 5 | 005 | Technical Assistance | National Chamber of Industries (CNI) | 5/02/2011 |
| 6 | 006 | Technical Assistance | CADEFOR | 1/20/2011 |
| 7 | 007 | Technical Assistance | CADEFOR | 1/20/2011 |
| 8 | 008 | Grant | Palo Santo | 3/14/2011 |

| USAID ENVIRONMENTAL DATASHEETS OCTOBER 2010 - SEPTEMBER 2011 | | | | |
|--|------|-----------------------|-----------------|------------|
| Textile and Apparel Value Chain | | | | |
| # | Code | Activity | Institution | Start Date |
| 1 | 012 | Grant (Strengthening) | IDEPRO | 1/10/2011 |
| 2 | 013 | Technical Assistance | IDEPRO | 1/17/2011 |
| 3 | 014 | Technical Assistance | IDEPRO | 1/17/2011 |
| 4 | 015 | Technical Assistance | IDEPRO | 1/17/2011 |
| 5 | 016 | Technical Assistance | IDEPRO | 2/07/2011 |
| 6 | 017 | Technical Assistance | IDEPRO | 2/14/2011 |
| 7 | 018 | Grant | Téllez Workshop | 3/21/2011 |
| 8 | 019 | Grant | CAMEX | 9/30/2011 |
| 9 | 020 | Technical Assistance | APIMEC | 9/30/2011 |
| 10 | 021 | Technical Assistance | APOSTROFE | 9/18/2011 |
| 11 | 022 | Technical Assistance | APOSTROFE | 9/18/2011 |
| 12 | 023 | Technical Assistance | APOSTROFE | 9/18/2011 |

APPENDIX 2

| Inspection Visit Chart October 2010 - September 2011 | | | | | |
|---|-----------------|-------------------|--------------------------|--|---|
| # | Name | Date | Location | Firms | Progress Made on Recommendations |
| 1 | Cecilia Segovia | October 8 - 9 | Santa Cruz Cochabamba | <i>Stop Jeans - Leito Jeans - Ronin Jeans Brener Jeans - Fremar - Jialum</i> | The firms have been incorporating recommendations according to timetable |
| 2 | Cecilia Segovia | March 24 - 25 | Cochabamba | <i>Pachis - Arco Iris - Brener Jeans</i> | The firms require greater supervision due to delays in the implementation of recommendations. |
| 3 | Cecilia Segovia | May 30 - 31 | Santa Cruz | <i>G7 - Fornax - Bisonte Americano</i> | The firms have incorporated other recommendations into its mitigation plans. |
| 4 | Cecilia Segovia | August 29 - 30 | Santa Cruz | <i>Stop Jeans - Leito Jeans - Ronin Jeans</i> | The firms don't present any environmental risks |
| 5 | Cecilia Segovia | August 22 - 24 | Cochabamba | <i>Brener Jeans - Fremar - William Jeans - Jialum - Pachis - Arco Iris</i> | The firms have carried out investments; in addition to fulfilling short-term recommendations, progress has been made in long-term recommendations |
| 6 | Ximena Jáuregui | October 28 - 29 | Santa Cruz | Wood and Wood Furniture Tradeshows | The firm has been incorporating recommendations according to timetable |
| 7 | Ximena Jáuregui | November 25 - 26 | Tarija | Processed Foods Tradeshows | The firms have adjusted implementation plans |
| 8 | Ximena Jauregui | December 7 | Cochabamba | Processed Foods Tradeshows | The firm has incorporated other recommendations into its mitigation plans. |
| 9 | Ximena Jauregui | December 11 | Santa Cruz | OLEUNS BEAUTY | The firm requires greater supervision due to delays in the implementation of recommendations. |
| 10 | Ximena Jauregui | January 20 | Santa Cruz | Handcraft Fairs | The firm requires greater supervision due to delays in the implementation of recommendations. |
| 11 | Ximena Jauregui | January 25 | Cochabamba | Textile and Apparel Tradeshows | The firms don't present any environmental risks |
| 12 | Ximena Jauregui | March 24 - 25 | Santa Cruz | Wood and Wood Furniture Tradeshows | The firms don't present any environmental risks |
| 13 | Ximena Jauregui | March 10 | Cochabamba | Wood and Wood Furniture Tradeshows | The firms don't present any environmental risks |
| 16 | Ximena Jauregui | September 20 - 22 | Santa Cruz | EXPOCRUZ Tradeshow | The firm has been incorporating recommendations according to timetable |

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| | | | | | |
|----|--------------|---------------------|---|---|---|
| 18 | Luis Pardo | October 8 - 9 | Santa Cruz Cochabamba | Gas Oil Manufactures – Gasoline Apparel – <i>Wamach</i> Apparel | The firms have complied with all observations |
| 19 | Luis Pardo | October 28 - 29 | Santa Cruz | <i>Sport Boys - G Casa Club - Rodmar – Vicos</i> | The firms don't present any environmental risks |
| 20 | Luis Pardo | November 1 | Cochabamba | <i>Cosnatval</i> | The firm has carried out investments; in addition to fulfilling short-term recommendations, progress has been made in long-term recommendations |
| 21 | Luis Pardo | December 8 | Santa Cruz Cochabamba | Entrepreneurial Ideas Workshops | The firm has been incorporating recommendations according to timetable |
| 22 | Luis Pardo | December 14 | Santa Cruz | <i>Oleuns Beauty</i> | The firm has adjusted implementation plans |
| 23 | Luis Pardo | January 13 | Cochabamba | <i>William Jeans - Jialum - Pachis</i> | The firms have incorporated other recommendations into its mitigation plans. |
| 24 | Luis Pardo | February 16 - 18 | Camargo | AFIPAC | The firm has been incorporating recommendations according to timetable |
| 25 | Luis Pardo | February 22 - 24 | Padilla | APAJIMPA | The firm requires greater supervision due to delays in the implementation of recommendations. |
| 26 | Luis Pardo | March 10 - 12 | Yacuiba | ASOPROMANI | The firm has complied with all observations |
| 27 | Luis Pardo | March 24 - 25 | Cochabamba | AGROCAINE – Peanut Producer | The firm has adjusted implementation plans |
| 28 | Luis Pardo | April 26 | Santa Cruz | Visit to potential partnerships | The firms have been incorporating recommendations according to timetable |
| 29 | Luis Pardo | May 13 - 14 | Mizque (Department of Cochabamba) | Honey Producer | The firm requires greater supervision due to delays in the implementation of recommendations. |
| 30 | Luis Pardo | June 9 | Santa Cruz | | The firm has complied with all observations |
| 32 | Luis Pardo | July 7 - 9 | Mizque (Department of Cochabamba) | Survey of potential PPPs | The firm has incorporated other recommendations into its mitigation plans. |
| 33 | Luis Pardo | July 12 - 15 | Sucre Other locations | Survey of potential PPPs: Padilla, Muyupamapa, Monteagudo, Camargo | The firm has carried out investments; in addition to fulfilling short-term recommendations, progress has been made in long-term recommendations |
| 35 | Luis Pardo | August 18 - 19 | Santa Cruz | <i>Obvio Jeans - Abasteciendo - Manjar de Oro</i> | The firms don't present any environmental risks |
| 37 | Luis Pardo | August 29 - 30 | Guarayos (Department of Santa Cruz) | Women's Association – Valles Foundation | The firms don't present any environmental risks |
| 38 | Luis Pardo | September 23 | Cochabamba | Laundry Association | The firm has carried out investments; in addition to fulfilling short-term recommendations, progress has been made in long-term recommendations |
| 39 | Jose Montaña | October 22 | Cochabamba | Monitoring of sales and employment indicators | The firm has incorporated other recommendations into its mitigation plans. |
| 40 | Jose Montaña | November 18 - 19 | Santa Cruz | Monitoring of sales and employment indicators | The firm doesn't present any environmental risks |

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| | | | | | |
|----|------------------|-------------------|--|---|---|
| 42 | Jose Montaña | January 13 - 14 | Santa Cruz Cochabamba | Monitoring of sales and employment indicators | The firm has incorporated other recommendations into its mitigation plans. |
| 43 | Jose Montaña | February 24 - 26 | Guarayos (Department of Santa Cruz) | FAN firms | The firms have carried out investments; in addition to fulfilling short-term recommendations, progress has been made in long-term recommendations |
| 44 | Jose Montaña | April 25 | Cochabamba | Monitoring of sales and employment indicators | The firm has incorporated other recommendations into its mitigation plans. |
| 45 | Jose Montaña | June 16 - 17 | Santa Cruz | Monitoring of sales and employment indicators | The firm has carried out investments; in addition to fulfilling short-term recommendations, progress has been made in long-term recommendations |
| 46 | Adhemar Aparicio | June 16 - 17 | Santa Cruz | <i>Oleuns Beauty</i> | The firm doesn't present any environmental risks |
| 47 | Adhemar Aparicio | August 11 - 13 | Sucre | Tradeshows | The firms have complied with all observations |
| 48 | Adhemar Aparicio | September 10 - 11 | Tarija | <i>Inmunovida - Unec</i> | The firms have complied with all observations |
| 49 | Pamela Carrasco | May 30 - 31 | Santa Cruz | <i>Manjar de Oro - Tecnoalimentos - Asael - Alimenta</i> | The firms have adjusted implementation plans |
| 50 | Pamela Carrasco | July 12 - 15 | Santa Cruz Other locations | <i>Patra - Via Sport - Fitness Club - Expresiva - Confecciones Sion - Rene Jeans - Mercedes Jeans - Clarabella - La Campiña</i> | The firms have incorporated other recommendations into its mitigation plans. |
| 51 | Pamela Carrasco | August 22 - 24 | Cochabamba | APIMEC Wood firms | The firms have carried out investments; in addition to fulfilling short-term recommendations, progress has been made in long-term recommendations |
| 52 | Pamela Carrasco | August 29 - 30 | Santa Cruz | <i>Zumos - Abasteciendo - Panadería Belén - Casab</i> | The firms have carried out investments; in addition to fulfilling short-term recommendations, progress has been made in long-term recommendations |